

US009904502B2

(12) United States Patent

Yan et al.

(54) DUAL DISPLAY EQUIPMENT WITH ENHANCED VISIBILITY AND SUPPRESSED REFLECTIONS

(71) Applicant: Apple Inc., Cupertino, CA (US)

(72) Inventors: Jin Yan, Santa Clara, CA (US);
Enkhamgalan Dorjgotov, San
Francisco, CA (US); Young Cheol
Yang, Sunnyvale, CA (US); Li Zhang,
Sunnyvale, CA (US); Xiaokai Li,
Cupertino, CA (US); Cheng Chen, San

Jose, CA (US)

(73) Assignee: Apple Inc., Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 71 days.

(21) Appl. No.: 14/862,012

(22) Filed: Sep. 22, 2015

(65) **Prior Publication Data**

US 2017/0039018 A1 Feb. 9, 2017

Related U.S. Application Data

- (60) Provisional application No. 62/201,359, filed on Aug. 5, 2015.
- (51) Int. Cl. G06F 3/14 (2006.01) G06F 1/16 (2006.01) H04M 1/02 (2006.01)
- (52) **U.S. Cl.**CPC *G06F 3/1423* (2013.01); *G06F 1/1601* (2013.01); *G06F 1/1616* (2013.01); (Continued)

(10) Patent No.: US 9,904,502 B2

(45) **Date of Patent:**

Feb. 27, 2018

(58) Field of Classification Search

CPC G06F 1/1616; G06F 1/1647; G06F 1/1649; G06F 1/1601; G06F 1/162; G06F 3/1423; (Continued)

(56) References Cited

U.S. PATENT DOCUMENTS

6,744,478 B1* 6/2004 Asakura G02B 27/0101 349/11 7,158,095 B2 1/2007 Jenson et al.

(Continued)

OTHER PUBLICATIONS

Gibbs, Keith. (2013). "Reflection (Plane Mirrors)". Schoolphysics. Retrieved from http://www.schoolphysics.co.uk/age16-19/Optics/Reflection/text/Reflection_/index.html, downloaded Jan. 26, 2017, p. 3, Fig. 3.*

(Continued)

Primary Examiner — Darlene M Ritchie (74) Attorney, Agent, or Firm — Treyz Law Group, P.C.; G. Victor Treyz; Joseph F. Guihan

(57) ABSTRACT

Electronic equipment with displays may be provided. A first display may be mounted in a first housing and a second display may be mounted in a second housing that is adjacent to the first housing. The first housing may rotate relative to the second housing about a hinge axis. The first housing may be a lid and the second housing may be a base housing that is coupled to the lid by a hinge. A first display may be mounted in the first housing and a second display may be mounted in the second housing. Polarizer layers and other optical layers in the displays may be configured to provide a viewer with the ability to view images on the displays while wearing vertically polarized sunglasses and to suppress reflections of light emitted by the first display off of the second display.

23 Claims, 8 Drawing Sheets

